Late Cenozoic History of the Yukon River Valley, Fort Selkirk to its Confluence with the White River

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The Plio-Pleistocene record of terrace formation, glacial incursion, and volcanic eruption was investigated to reconstruct the evolution of the Yukon River valley from Fort Selkirk to Stevenson Ridge map area. Regional surficial geology mapping was carried out in the unmapped portion of the study area (NTS map sheet 115 J/13,14,15). Surficial deposits range in age from latest Tertiary to Holocene. Mapping reveals a mature landscape in which colluvial blankets and veneers cover hillsides and ridge tops. Bedrock exposures are rare. Fluvial plains, glaciofluvial terraces, loess aprons, and organic fills have accumulated in most valley bottoms. The regional extent of glacial features, the distribution of surficial materials, and inventories of pebble lithologies in tributary drainages indicate that incursion of the Cordilleran Ice Sheet into tributary valleys did not extend beyond the confluence of Britannia Creek and Yukon River. However, local alpine areas above 4000 ft (1220 m) did support cirque glaciers.

Stratigraphic, paleomagnetic and radioisotope investigations of the Selkirk Volcanic Group have identified a new eruptive period and constrained the age of the Reid Glaciation in central Yukon. Approximately 10 km downstream from Fort Selkirk, a succession of 311±32 ka basalt flows, is overlain by outwash deposited during the Reid Glaciation. This relationship combined with a minimum age of 190 ka provided by the Sheep Creek tephra constrains the Reid Glaciation to Oxygen Isotope stage 8. The presence of thick, forset-bedded, pillow breccia units intercalated with middle and early Pleistocene subaerial flows indicates that lavas repeatedly caused damming of the Yukon River.

A record of pre-Reid glaciation is chronicled by the presence of glaciofluvial terraces within the study area. Two populations of pre-Reid terraces were identified according to comparisons of their degree of soil development, terrace elevation, and regional glacial stratigraphy. Terraces 200-250 m above river level have preserved morphological and mineralogical features of the Wounded Moose paleosol (early Pleistocene). Soil development, characteristic of the Diversion Creek paleosol (middle Pleistocene), commonly occurs on pre-Reid terraces between 110 and 30 m above river level. These findings suggest that soils with characteristics of the Diversion Creek paleosol also developed prior to the Reid glaciation and that the soil chronosequence established for the central Yukon requires refinement.